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Site Safety Plan

***Waukegan Manufactured Gas
and Coke Plant Site
Waukegan, Illinois***

Prepared for North Shore Gas Company

***Under the Administrative Order on Consent Re: Remedial Investigation and
Feasibility Study for the Waukegan Manufactured Gas and Coke Plant Site
Waukegan, Illinois***

July 1, 1991

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Barr

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SITE SAFETY PLAN
WAUKEGAN MANUFACTURED GAS AND COKE PLANT SITE

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BARR ENGINEERING CO. - SITE SAFETY PLAN

A. GENERAL INFORMATION

SITE: WCP Site PROJECT NUMBER: 13/49-003JSL14
LOCATION: Waukegan, Illinois
PLAN PREPARED BY: W. Mielke/ DATE: 12/17/90
M. Dymond
UPDATED BY: M. Dymond DATE: 6/13/91
REVIEWED BY: K. Stoller DATE: 1/3/91
UPDATE REVIEWED BY: K. Stoller DATE: 6/14/91
PROPOSED DATE OF PROJECT: 1991 through 1994
DOCUMENTATION/SUMMARY: OVERALL HAZARD Serious: _____ Moderate: X
Low: _____ Unknown: _____

The Site Safety Plan has been developed with guidance contained in the following regulations and guidance documents:

- Occupational Safety and Health Administration (OSHA) Standards, 29 CFR 1910 and 1926.
- U.S. EPA "Health and Safety Audit Guidelines," December 1989.
- NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.
- Barr Corporate Health and Safety Manual.
- American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances in the Work Environment," 1989-1990.

The Safety Plan is based on information available as of June 1991, and is subject to revision as new data and information on potential health and safety hazards on the site become available.

B. SCOPE OF WORK

Objective: RI/FS of old coal gasification/coke plant/creosoting site; field investigation involves test trenching, monitoring well installation, soil borings, groundwater and soil sampling, surveying (contracted).

C. SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions on site. All staff members participating in field activities have been trained in the identification of safety and health hazards (see Section P) and participate in a medical surveillance program. (Note: One person may carry out more than one job function.)

| | |
|--------------------------|--|
| PRINCIPAL-IN-CHARGE | Dean Malotky |
| PROJECT MANAGER | Mike Relf |
| ENGINEER | Will Mielke |
| HYDROGEOLOGIST | Mike Relf |
| GEOLOGIST | John Fox |
| WORK SITE SAFETY OFFICER | John Fox or senior site safety trained Barr employee on site |
| SAMPLERS | Steve Iverson, Kim Johannessen, Dale Sova |
| SURVEYORS | |
| SENIOR PROJECT ENGINEER | Jim Langseth |

D. SITE CHARACTERISTICS AND FACILITIES

| <u>WASTE TYPE(S)</u> | <u>CHARACTERISTIC(S)</u> | |
|----------------------|---------------------------|------------------------|
| Liquid <u> X </u> | Corrosive <u> </u> | Toxic <u> X </u> |
| Solid <u> X </u> | Ignitable <u> </u> | Reactive <u> </u> |
| Sludge <u> </u> | Radioactive <u> </u> | Unknown <u> X </u> |
| Gas <u> </u> | Volatile <u> X </u> | Other <u> </u> |

1. SITE DESCRIPTION

The Waukegan Manufactured Gas and Coke Plant (WCP) site is located in Waukegan, Illinois, approximately 35 miles north of Chicago. The site is located on a peninsula on the east side of Waukegan Harbor.

The WCP site is bounded to the north by Sea Horse Drive (formerly Pershing Road), on the east by Sea Horse Drive, on the south by Outboard Marine Corporation (OMC) Plant No. 1 and on the west by the Waukegan Harbor (Figure 1). The site is currently vacant with the exception of an above-ground storage tank farm in the southwest corner, boat racks in the northwest portion, and the OMC Data Building and Office Building in the southwestern portion of the site. A spoil pile from dredging of Waukegan Harbor is at the western edge of the site. A coal gasification and coking plant was located at the site from 1927 until its dismantling in approximately 1972. There is also evidence of a wood treating plant which apparently operated from 1908 to 1912. The wood treating plant was probably dismantled in the decade after it ceased operations. Refer to Figure 2 for the locations of the various process units for the coke plant and wood treating plant. There is evidence that many of the building foundations remain on

the site. The only intact structure that remains from the coking plant operations is an office building on the southeast corner of the site.

2. SITE FACILITIES

The site facilities are in the OMC Office Building. At the present time, the exact facilities in the OMC Office Building are not known and permission to use this facility would need to be obtained.

3. UNUSUAL FEATURES

The western edge of the site is bordered by the Waukegan Harbor. Dredge spoils on the western edge of the site could pose problems for operation of heavy equipment in that area. A boat slip for servicing and storing boats has been constructed in the northwestern portion of the site.

4. SITE SECURITY

The site is fenced around the landward perimeter. Access to the site from the landward side is through a locked gate in the parking lot of the OMC Data Building or locked gates off Sea Horse Drive. The site is accessible by boat along the west side. Construction of a new slip and transfer of Larsen Marine activities to that new slip will alter the current site controls. Because the site is a Superfund site, EPA and OSHA health and safety requirements will apply to all visitors to the site. When exclusion zones are established for site investigation work, access to those exclusion zones is to be limited to personnel operating under a Site Safety

Plan that has been submitted to the U.S. EPA Region V. Barr Engineering does not undertake or assume responsibility for the safety and/or health of non-Barr personnel.

5. UTILITIES

An abandoned 8-inch sanitary sewer force main is known to run north-south on the western side of the site. A new 8-inch force main runs along Sea Horse Drive along the west and north sides of the site. A 24-inch pipe from the former suction well now serves as a storm sewer. It runs east-west in the southern portion of the site. An overhead power line runs north-south on the eastern half of the site.

6. STATUS

Inactive; construction of new boat slip in northwest portion of site was conducted from November 1990 through at least June 1991.

7. SITE REMEDIATION HISTORY

The Waukegan Harbor, which is adjacent to the site, has been investigated for PCB contamination. A soil investigation regarding the construction of a new slip was performed by Canonic Environmental. This study showed high levels (~10,000 ppm) of PAHs in the soil. The soil borings were concentrated at the northwest part of the site. In addition, two nests of monitoring wells were installed. An Illinois EPA investigation found PAHs up to ~2,000 ppm in site soils.

E. GENERAL SITE HAZARDS

1. PHYSICAL HAZARDS:

Physical hazards associated with excavation, earth moving, and working around large equipment may pose the greatest hazard at the project site. Barr personnel should remain visible to equipment operators at all times when observing, testing or measuring and should maintain a safe observation distance except when collecting soil sample from driller.

If soil samples are required from excavation materials, samples should be taken from bucket of backhoe instead of entering excavation. Any entry to an excavation or trench must be cleared through the project manager.

The use of personal protective equipment may limit visibility, hearing or manual dexterity. In addition, wearing personal protective equipment (such as tyvek, boot covers, respirators, etc.) may require additional physical exertion of the wearer.

2. CHEMICAL HAZARDS

Table 1 lists the highest reported concentration, exposure guidelines, and some physical/chemical properties of contaminants found on this site. Potential exposure routes, toxicity information, and additional physical/chemical properties can be found in Appendix E. The Threshold Limit Value (TLV) and odor thresholds are based on inhalation of contaminants in air. The concentration of a compound measured in soils or water cannot be

directly compared to the TLV in air; however, it can be used as a guideline in assessing health risk.

TABLE 1

HIGHEST REPORTED CONCENTRATIONS OF CONTAMINANTS

| Chemical Substance | Highest Concentrations Detected in Soils (mg/kg) | Highest Concentrations Detected in Ground-water (ppm) | TLV ¹ (ppm) | IDLH ² (ppm) | STEL ³ (ppm) | Odor Threshold (ppm) | Vapor Pressure (mm/Hg) | IP ⁴ (eV) |
|--------------------|--|---|---------------------------------------|-------------------------|-------------------------|----------------------|------------------------|----------------------|
| Semi-Volatiles | | | | | | | | |
| tPAHs | 27,000 | 1.1 | [0.2 mg/m ³] ⁵ | NA | NA | NA | .004 | NA |
| cPAHs | 3,110 | ND | [0.2 mg/m ³] ⁵ | NA | NA | NA | NA | NA |
| Naphthalene | 12,000 | .7 | 10 | 500 | 15 | 0.08 | 0.05 | 8.12 |
| Phenol | 73 | 160 | 5 | 250 | NA | 0.05 | 0.36 | 8.5 |
| Inorganics | | | | | | | | |
| Arsenic* | 956 | NA | 0.2 mg/m ³ | NA | NA | NA | NA | NA |
| Cyanide (skin) | 556 | NA | 5 mg/m ³ | 50 mg/m ³ | NA | 1 mg/m ³ | =0 | NA |
| PCBs* (skin) | 10,000 | NA | 0.5 mg/m ³ | NA | NA | NA | .001 to .000001 | NA |
| Volatiles | | | | | | | | |
| Benzene* | 1.8 | NA | 10 | NA | NA | 4.68 | 75 | 9.25 |
| Toluene | 1.9 | NA | 100 | 2000 | 150 | 0.17 | 22 | 8.82 |
| Ethyl Benzene | .6 | NA | 100 | 2000 | 125 | 140 | 7.1 | 8.76 |
| Xylenes | 8.5 | NA | 100 | 1000 | 150 | 0.05 | 9 | 8.56 |

*Suspect human carcinogen.

Skin: Indicates skin absorption as additional route for exposure.

NA: Information not available.

ND: None detected.

¹TLV: Threshold Limit Value.

²IDLH: Immediately Dangerous to Life or Health.

³STEL: Short Term Exposure Limit.

⁴IP: Ionization Potential (Note the HNU/OVM have a 10.2 eV lamp).

⁵Some PAHs are constituents of the coal tar pitch volatiles (CTPV) mixture.

The ACGIH TLV for CTPVs is 0.2 mg/m³.

F. PROJECT TASKS

Each project task on site has been identified in Table 2 and has been assigned a protection level, based on its inherent health and safety hazard. These protection levels may be modified by the site safety officer depending on specific site conditions, equipment configuration, air monitoring results and previous experience; however, all modifications must be documented in the BARR SAFETY DIARY. The Barr Safety Diary should be maintained at the site with Barr personnel at all times, and be returned to Company Safety Manager at completion of project or whenever book becomes full, whichever comes first.

TABLE 2
PROJECT TASKS

| Task | Task Description | Risk Analysis | Level Protection ¹ |
|------------------------------|--|------------------------------------|-------------------------------|
| Test Trenching | Observation of trench excavation | Inhalation/skin exposure potential | D2/C1* |
| Monitoring Well Installation | Observation of installation of monitoring wells | Inhalation/skin exposure potential | D2/C1* |
| Soil Borings | Observation of soil boring advancement | Inhalation/skin exposure potential | D2/C1* |
| Groundwater Sampling | Collection of water samples from monitoring wells | Skin exposure potential | D3 |
| Soil Sampling | Collection of surface soil samples and boring soil samples | Inhalation/skin exposure potential | D3/C2* |
| Surface Water Sampling | Collection of surface water samples | Inhalation/skin exposure potential | D3 |
| Hydraulic Conductivity Test | Insertion and withdrawal of instrumentation into and from monitoring wells | Skin exposure potential | D3 |

*Level C respirator upgrade shall be made under visibly dusty conditions.

¹Levels of protection are defined in Table 3.

G. SITE CONTROL

Site control minimizes potential contamination of workers, protects the public from a site's chemical and physical hazards, facilitates work activities, and helps prevent vandalism. See Figure 1 for the site location. Figure 2 identifies the investigation area. The site work zones and prevailing wind direction (with respect to work zones) are defined on Figure 4.

Site Work Zones

There are three work zones on this site (see Figure 4): the restricted zone, which consists of the hot zone and exclusion zone, the contamination reduction zone (decon), and the support zone. In the field, these zones will be defined by physical/visual segregation of work activities.

Restricted Zone

The restricted zone is defined as the area where contamination is either known or is likely to be present, or because of site activities, will provide a potential to cause harm to personnel. Within the restricted zone are the hot zone, exclusion zone, and contamination reduction zone, described below.

1. Hot Zone

The immediate area of any field investigation activity shall be deemed a "hot zone" (i.e. drill rig). The "hot zone" for any given soil exploration point may include a 10 to 15-foot radius from the exploration point. All open trenches are considered "hot zones".

Figure 4 shows an example safety work zone diagram. Drilling and sample collection will be conducted in the hot zone.

2. Exclusion Zone

The area surrounding a "hot zone" will be called the exclusion zone. The "exclusion zone" shall include any drainage, spilled material, leachate, excavated soil, or any visibly discolored material. A minimum level of protection is required for entry into "exclusion zone" and entry into "hot zone" may require an upgrade in protection level.

The exclusion zone boundary will be recorded in the BARR SAFETY DIARY. The following factors will be considered in establishing or changing the exclusion zone boundary: (1) physical and topographical features, (2) weather conditions, (3) field monitoring and laboratory data of air contaminants and environmental samples, (4) physical, chemical and toxological characteristics of contaminants, and (5) potential for exposure. Please reference Figure 4 for an example site work zone diagram. These zones will be set up at each exploration location. Soil boring observation, soil sample collection and other field screening procedures will be conducted in the "exclusion zone".

3. Contamination Reduction Zone

The contamination reduction zone (decon area) will be located adjacent to the exclusion zone and be fitted with decontamination equipment. Field team members should perform decontamination activities as close as possible to the outer boundary of the exclusion zone and up wind of the exclusion zone. Care should be

taken to keep clean areas free of contamination by limiting the physical transfer of contaminated substances by people, equipment, or in the air. Please reference Figure 4 for an example site work zone diagram. These zones will be set up at each exploration location.

4. The Support Zone

The support zone is the clean (uncontaminated) area in which normal work clothes may be worn and in which vehicles may be parked. This will be an area outside and upwind of the contamination reduction zone. Please see Figure 4.

H. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Table 3 describes personal protective equipment required for each level. Levels of personal protection may vary according to the activity being conducted and the hazards which may be encountered. Within the specified levels, sublevels of protection may be used and are characterized by the degree of skin protection required. These sublevels have been designated as Level D1, D2, D3, C1, and C2. Personal protective equipment selection is made on the basis of site-specific chemical and physical hazards at the time of Project Safety Plan preparation. Selection is made by a specialist trained in the area of health and safety. No downgrades in specified level of protection shall be made without approval of site safety officer and subsequent documentation in BARR SAFETY DIARY.

**TABLE 3
PERSONAL PROTECTION LEVELS***

R = Required O = Optional

| | D1 | D2 | D3 | C1 | C2 |
|------------------------------------|----|----|----|----|----|
| GENERAL SAFETY EQUIPMENT | | | | | |
| Hard Hat | R | R | R | R | R |
| Safety Glasses | R | R | R | R | R |
| Chemical Goggles/Face Shield | O | O | O | - | - |
| Hearing Protection (See 3 below) | O | O | O | O | O |
| BOOTS | | | | | |
| Steel Toe Boots | R | - | - | - | - |
| Chemical Resistant Steel Toe Boots | O | R | R | R | R |
| Boot Covers | R | R | R | R | R |
| CLOTHING | | | | | |
| Cotton Coveralls/Kleengard | R | O | O | O | O |
| Tyvek - 1 Piece | O | R | - | R | - |
| Poly-Coated Tyvek 1-Piece/Hooded | - | - | R | - | R |
| Saranex Tyvek 1-Piece/Hooded | - | - | - | - | - |
| RESPIRATORS | | | | | |
| Full Face - Filters/Cartridges | - | - | - | R | R |
| Full Face - Canister | - | - | - | O | O |
| ELSA | O | O | O | O | O |
| SCBA/Supplied Air | - | - | - | - | - |
| Disposable Respirator | O | O | O | - | - |
| GLOVES | | | | | |
| Inner Glove | R | R | R | R | R |
| Outer Glove | O | R | R | R | R |

SPECIAL CONSIDERATIONS

1. Level C respirator upgrade shall include MSA full-facepiece with combination GMC-H Cartridges.
2. Other equipment on site should include portable eyewash station and potable bottled water, if water is not easily accessible.
3. Hearing protection is mandatory during soil boring and monitoring well installation.
4. SEE APPENDIX B: COLD STRESS GUIDELINES.
5. SEE APPENDIX C: HEAT STRESS GUIDELINES.
6. Any upgrade or downgrade in personal protection level should be documented in the Barr Safety Diary

*Level D and C sublevels of protection are determined by the degree of skin protection required for the tasks listed on Table 2.

I. AIR MONITORING

Table 4 indicates which exposure monitoring instruments should be used on site at the specified intervals. Exposure monitoring should be conducted in the breathing zone and should be conducted both upwind and downwind for comparison purposes.

TABLE 4
AIR MONITORING INSTRUMENTATION

| Monitoring Equipment | Task | Action Levels | Frequency | Record Data |
|---|---|---|---|--|
| MSA 260/360 or Microgard | Monitoring Well Installations Soil Boring Soil Sampling Water Sampling Test Trenching Hydraulic Conductivity Testing | <10% LEL = Level D >10% LEL = Leave area | Continuous | Every hour (indicate range of values) |
| HNU/ Organic Vapor Analyzer/ OVM | Monitoring Well Installations Soil Boring Soil Sampling Water Sampling Test Trenching Hydraulic Conductivity Testing | <5ppm = Level D >5ppm (for 10 min.) = Level C >100 ppm = Leave site and reassess | Continuous | Every hour (indicate range of values) |
| Detector tubes for benzene, toluene, xylene, phenol | Monitoring Well Installations Soil Boring Soil Sample Test Trenching Excavation observation | None. Use data to modify organic vapor action level | Daily when levels >5ppm | Every hour |
| MINIRAM Aerosol Monitor | During dusty conditions | <5 mg/m ³ dust = Level D >5 mg/m ³ dust = Level C | Continuous when dusty | Every hour (indicate range of values) |
| Personal Air Sampling Pump | Excavation observation | None. Use data to modify organic vapor action level. | 2 days first week of excavation. 2 days/week during highly contaminated excavation | Submit samples for analysis |
| Thermo-Luminescent Badge | Worn continuously while on site | NA | NA | NA |

Site safety officer should be notified whenever action levels are exceeded and Barr personnel should document monitoring information in BARR SAFETY DIARY.

Equipment Calibration: Equipment is calibrated once a week and as needed. The MSA 260/360 and Microgard is calibrated with a combination of compressed gases including carbon monoxide, oxygen, methane, and butane. Isobutylene is used to calibrate the HNU. Methane is used for the Organic Vapor Analyzer.

Equipment Protection During Cold Weather: Store equipment inside overnight and in warm area when not in use. The Organic Vapor Analyzer will accurately function to -20°F; the HNU will accurately function to 10°F. Note the difference in their limitations. It is recommended that the Organic Vapor Analyzer be used when temperatures are below 10°F. The oxygen sensor in the MSA 260/360 and microgard will accurately function down to 32°F. Use down to 0°F is possible, if it is calibrated at that temperature.

J. BUDDY SYSTEM AND COMMUNICATION PROCEDURES

All Barr personnel should have an assigned buddy or shall have informed someone of location and activities on site, and should remain in visual/verbal contact with this person at all times while on this site. Table 5 lists the standard hand signals that should be used in case verbal communication is not possible:

TABLE 5
STANDARD HAND SIGNALS

| Hand Signal | Message |
|---|---|
| Hand cutting motion across throat | Shut down immediately; Leave area immediately. |
| Hand gripping throat | Out of air, can't breathe. |
| Grip partner's wrist or both hands around waist | Leave area immediately. |
| Hands on top of head | Need assistance. |
| Thumbs down | No; negative. |

K. DECONTAMINATION

Personnel and equipment leaving this site shall be thoroughly decontaminated at designated decon station.

Level D1 Contamination:

Barr personnel should wash hands, forearms, face and neck prior to eating, drinking, or using tobacco. Wash hard hat and safety glasses at end of each day.

Level D2 Contamination:

Barr personnel should remove protective clothing in this order:

1. Remove boot covers.
2. Remove outer gloves.
3. Remove tyvek/kleengard.
4. Remove chemical resistant boots. Change into street shoes.

5. Remove inner gloves.
6. Discard protective clothing into appropriate container.

Barr personnel should wash hands, forearms, face and neck prior to eating, drinking, or using tobacco. Wash hard hat and safety glasses at end of each day.

Level D3 Decontamination:

Barr personnel should remove protective clothing in this order:

1. Remove boot covers.
2. Remove outer gloves.
3. Remove polytyvek.
4. Remove chemical resistant boots. Change into street shoes.
5. Remove inner gloves.
6. Discard protective clothing into appropriate container.

Barr personnel should wash hands, forearms, face and neck prior to eating, drinking, or using tobacco. Wash hard hat and safety glasses at end of each day.

Level C Decontamination:

If upgrade to Level C is required, remove the respirator after removing the boot covers and outer gloves. Respirator shall be decontaminated according to the procedure described in the Respirator Program, Appendix D.

Sample Jars:

Sampling jars should be wiped with a mild soap solution after collection. Sampling equipment should be handled with gloves until decontaminated.

Decontamination Equipment:

Decontamination equipment required for each level is listed on Table 6.

TABLE 6
DECONTAMINATION EQUIPMENT

| Decontamination Equipment | Protection Level | |
|--|------------------|---|
| | D | C |
| Plastic garbage barrels and wash buckets | X | X |
| Liners for garbage barrels | X | X |
| Plastic drop cloths | X | X |
| Galvanized steel basins for boot wash | O | X |
| Tri-sodium phosphate detergent | O | O |
| Hand pump sprayers | O | O |
| Long handle soft bristle brushes | O | X |
| Large sponges or cloths/paper towels | X | X |
| Cleanser for respirators | - | X |
| Small stools or set ladders, chairs | O | O |
| Plastic bags | X | X |
| Steam generator | O | O |
| Liquid detergent and paper towels | X | X |
| Water | X | X |
| Deionized water | O | O |

X - Required
O - Optional
- - Not Applicable

L. WORK PRACTICES

1. Try to limit work on-site to daylight hours.
2. No smoking, eating, drinking or chewing tobacco during work tasks.
3. If respirator is necessary, assure no facial hair will limit respirator facepiece to face seal.
4. Avoid unnecessary contact with suspect contaminated waters or soils.
5. Work upwind as much as possible.
6. Limit kneeling, or sitting on ground.
7. Protect equipment from site contamination.
8. When sampling or measuring water levels, open well cap and allow it to air out for 5 minutes.
9. Advise site safety officer if using prescription drugs.
10. Minimize alcohol consumption or coffee consumption. Both liquids inhibit the body's ability to compensate for extreme hot/cold conditions.
11. Try to remove all jewelry before donning protective clothing.
12. Wash hands, forearms, face and neck before leaving site.
13. Avoid skin contact or touching of eyes or mouth while on site and prior to decontamination.

M. EXCAVATION ENTRY PROCEDURES

Excavations may be any human-made cut, cavity, trench, or depression in an earth surface formed by earth removal. Daily entry into excavations requires an evaluation by an appropriately trained Barr employee to determine if the excavation is safe for entry.

Before entering an excavation, document the following in the project safety diary:

1. List the type of data being recorded (excavation entry or excavation inspection).
2. List time and date of entry or inspection.
3. Why must entry be made and who will be entering the excavation?
4. Determination of whether to enter an excavation may be made by the excavation entry checklist provided and defined in Appendix G.

N. CONFINED SPACE ENTRY

Confined space entry should be avoided. Confined spaces may be any excavation, trench, or manhole(s), etc. where there may be a potential for dangerous air concentrations and limited egress. A confined space entry permit is required prior to all confined space entry. Determination of confined space classification and appropriate monitoring and protective levels will be determined at the time of permit issuance.

O. SAFETY MEETINGS

All Barr employees intending to go on-site will attend a safety session prior to the initialization of work. The orientation meeting shall cover:

1. Work areas -- Sampling locations, water supply, satellites.
2. Decontamination procedures -- Decon area, equipment, procedure.

3. Emergency procedures -- Location of emergency phone numbers and phone, evacuation routes.
4. Communication network -- Buddy system, hand signals.
5. Practice drive to nearest medical facility.
6. First aid procedures -- Location of first aid kit, eye wash station.
7. Site safety plan -- Review of plan and sign-off.

At the beginning of each work day, all Barr employees will meet at the site to review job tasks and specific safety precautions associated with each task.

Other meetings shall be held by site safety officer on a periodic basis and will review above issues, as needed. In addition, any changes to work plan and/or protective levels shall be communicated at this time and documented in BARR SAFETY DIARY.

P. TRAINING

All Barr employees on site should have attended a 40-hour training session which meets the requirements of 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response. Annually, each Barr employee shall attend an eight-hour refresher course. Certificates of completion are kept on file.

Q. MEDICAL SURVEILLANCE PROGRAM

All Barr employees on site shall participate in a medical surveillance program. Medical monitoring is required of all persons regularly assigned to work on site which contain or are suspected to contain hazardous wastes.

In the event that a Barr employee may be overexposed to a hazardous substance, the Site Safety Officer should be notified and further examination and diagnostic screening may be performed, as determined by Barr's medical advisor.

R. DOCUMENTATION

Field documentation shall be entered in the BARR SAFETY DIARY (yellow).
Following are entries which should be made:

1. Monitoring Data. Date, time, location, instrument type, instrument number and result, and field calibrations. Note comments about sampling in this section.
2. Site Safety Meetings. Names of Barr attendees, topics covered, changes in work plan.
3. Respirator Usage. Date, names of Barr personnel who used respirator, number of hours worn, type of respirator/filters/cartridges and contaminant levels monitored.
4. List of Barr Personnel On Site Each Day. Assure each has received a copy of site safety plan and is familiar with its contents.
5. Site Briefing. For all Barr employees new to site, document date and time of briefing.
6. Documentation. Document any changes in site safety plan, and any medical emergency situations.

S. EFFECTIVENESS OF SITE SAFETY PLAN

Site inspections shall be conducted as necessary to determine the effectiveness of this site safety plan. Any deficiencies noted in the site safety plan or in its implementation shall be documented in the BARR SAFETY DIARY. Any changes to the Site Safety Plan shall be made in a written addendum. This site safety plan shall be reviewed and updated on an annual basis.

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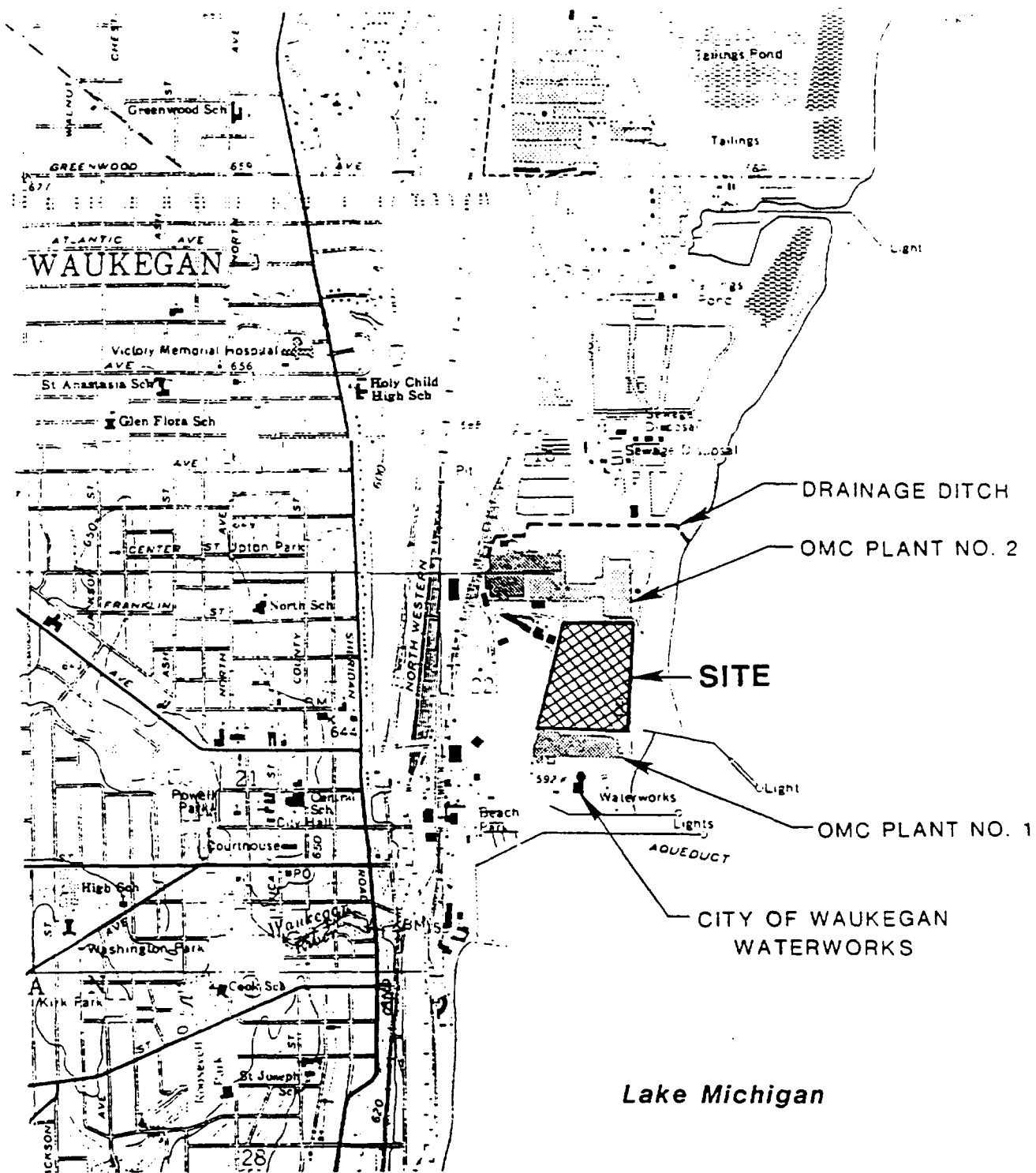
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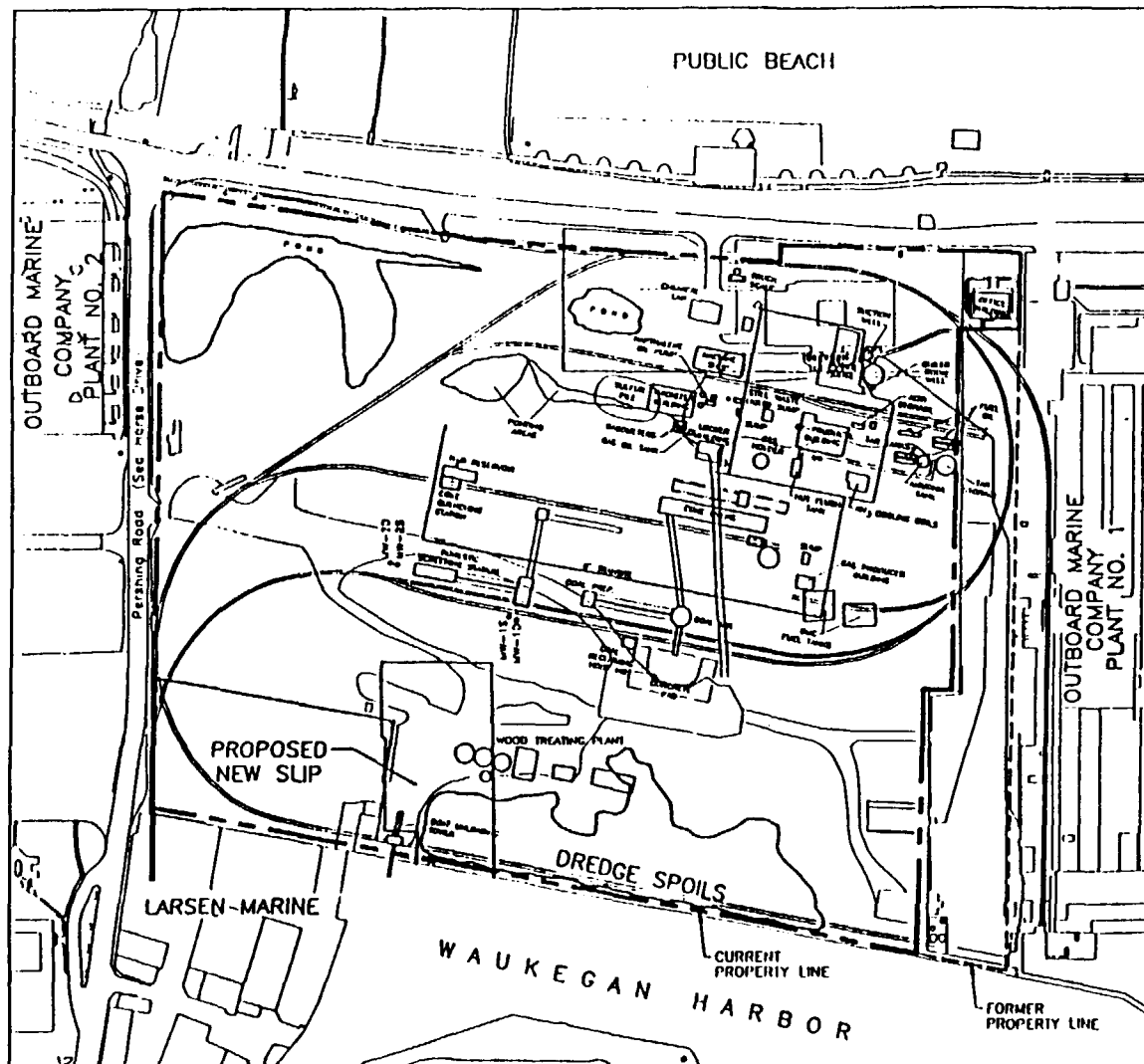
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Figures



0 2000 4000
Scale in Feet

Figure 1
Site Location Map



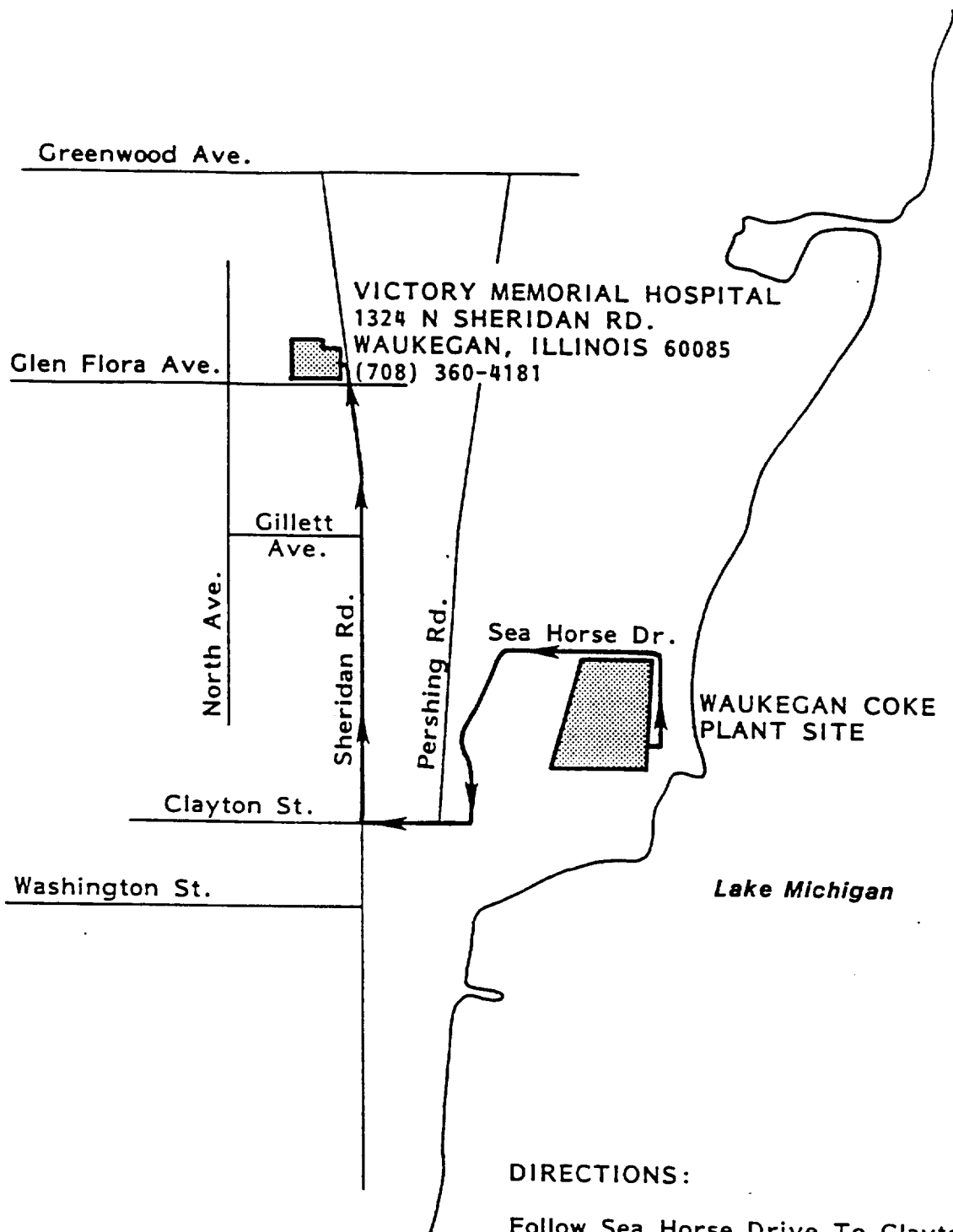
0 200 400
SCALE IN FEET

Base Map and locations of existing facilities provided by OMC.

Approximate location of Wood Treating Plant determined from USACE Map, 1908, and Sanborn Fire Insurance Map, 1917.

Locations of Coke Plant Facilities from aerial photographs and Sanborn Fire Insurance Maps.

Figure 2
WAUKEGAN MANUFACTURED GAS AND COKE PLANT SITE



Follow Sea Horse Drive To Clayton St.,
West On Clayton St. To Sheridan Road,
North On Sheridan Road Approximately
One Mile. The Hospital Is On The Left
Side Of Sheridan Road.

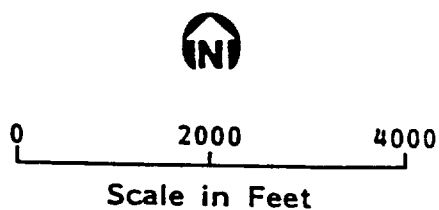
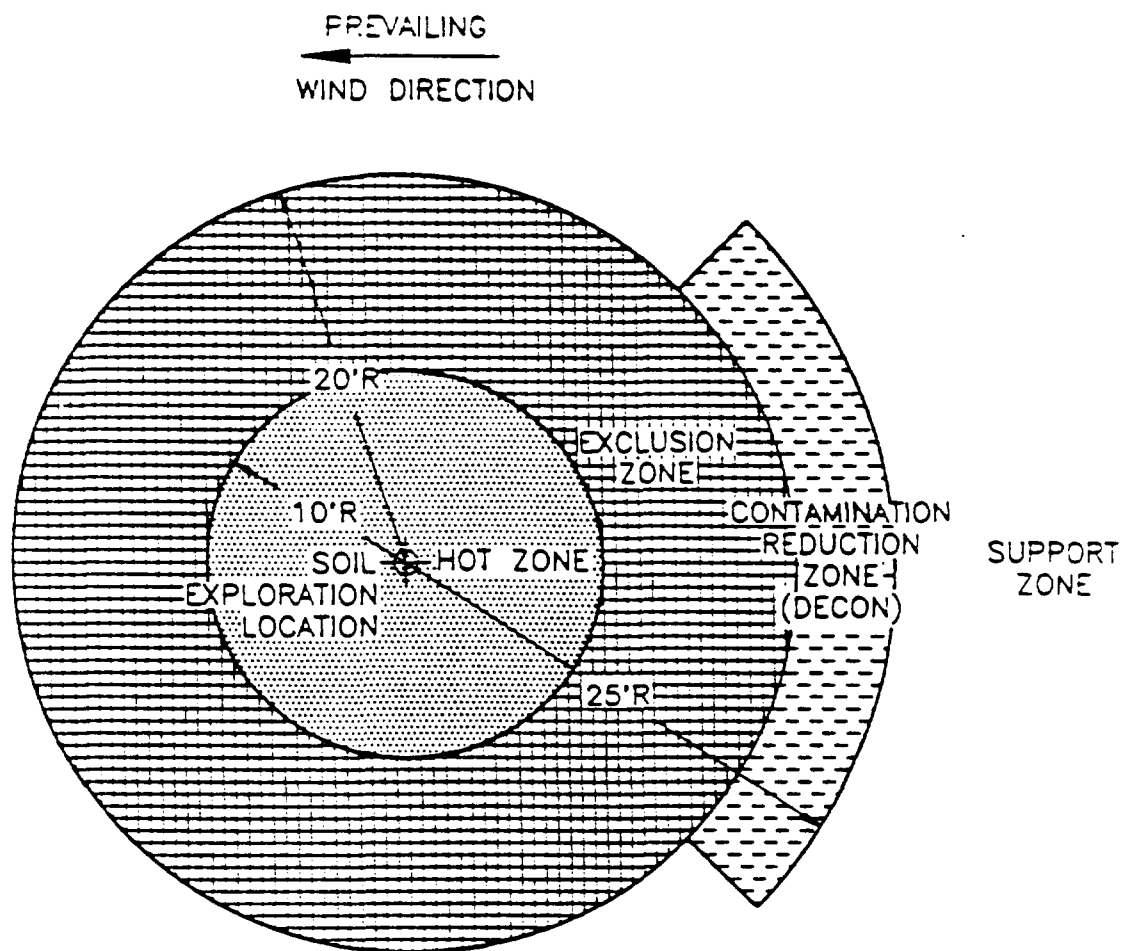


Figure 3
HOSPITAL LOCATION MAP
WAUKEGAN COKE PLANT SITE



RESTRICTED ZONE = HOT ZONE + EXCLUSION ZONE

Example of Safety Work Zones to be Established
at each Soil Exploration Location

Figure 4
SAFETY WORK ZONES

Appendix A

APPENDIX A
EMERGENCY RESPONSE PLAN

1.0 Pre-Emergency Planning

The local fire department, police department and hospital shall be notified of the nature of operations on this site prior to commencement of site operations. A copy of this notification shall be kept in the project file.

As part of the pre-emergency planning, all Barr personnel shall drive the route to the hospital prior to the commencement of site operations. The Barr project safety officer shall designate a vehicle to be used in emergency situations.

2.0 Personnel Roles, Lines of Authority, and Communication

The Barr project safety officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed. Upon attainment of non-emergency conditions, the project manager should be informed of the incident.

3.0 Emergency Recognition and Prevention

An emergency may be recognized by the presence of fire, an explosion, or release of hazardous substances. Environmental monitoring, as described in this project safety plan, shall be conducted on the recommended intervals to help safeguard against emergency conditions.

4.0 Safe Distances and Places of Refuge

In case of fire/explosion or release of hazardous substances, all personnel shall be evacuated to an area at least 100 feet upwind.

5.0 Site Security and Control

The general contractor shall be responsible for site security and control. The site is fenced off around the border. Access to the site is through a gate in the parking lot of the OMC Data Building. Access to the site by boat is possible on the west side of the site.

6.0 Evacuation Routes and Procedures

The general contractor shall be responsible for determining evacuation routes and procedures. All Barr personnel shall comply with the contractors emergency requirements. In the event that an evacuation route has not been established, all Barr personnel shall attempt to evacuate the site upwind and as quickly as possible. No regard to equipment in use at the time shall be made at the risk of personal safety.

7.0 Decontamination Procedures

In the event of an emergency, decontaminate injured persons as much as possible prior to transport to a health facility, if the injury is not life threatening. If the injury is life threatening, wrap the person and transfer as quickly as possible. Decontamination procedures, as described in this project safety plan, shall be followed whenever possible.

8.0 Emergency Medical Treatment and First Aid

In the case of serious medical emergency, call 911 for emergency medical assistance. Do not attempt to transport a seriously injured person to the hospital.

Emergency telephone numbers are listed below:

| <u>Agency/Facility</u> | <u>Telephone Numbers</u> |
|--|--------------------------|
| Police | 911 or 623-2121 |
| Fire | 911 or 623-2121 |
| Hospital Emergency Room | 360-4181 |
| IEPA Contact: Scott Moyer | (217) 782-6760 |
| MPCA Emergency Response (24-Hour Notification) | 296-8100 |
| Poison Control | 1-800-222-1222 |
| Barr Engineering Co. | (612) 830-0555 |
| Barr Engineering Occupational Physician: Dr. Jetzer | (612) 853-5371 |
| EPA Contact: Cindy Nolan | (312) 886-0400 |

Emergency First Aid procedures are described below:

| <u>Exposure</u> | <u>First-Aid Instructions</u> |
|-----------------|---|
| Eye Contact: | Flush eyes with clean water for at least 15 minutes. Seek medical attention, if needed. |
| Skin Contact: | Flush skin with clean water for at least 15 minutes. Remove contaminated clothing while flushing skin. Seek medical attention, if needed. |

Inhalation: Remove person to fresh air, away from active work area. Seek medical attention, if needed. Provide artificial ventilation by qualified individual, while awaiting emergency medical services.

Ingestion: Do not induce vomiting. Seek medical attention immediately.

Emergency route to hospital and hospital location map are shown in Figure 3. If possible, while a vehicle is en route to the hospital, a remaining Barr person shall call the hospital to notify them that an injured person will arrive soon and to provide background information on chemical/physical exposure.

9.0 Emergency Alerting and Response Procedures

The general contractor on the site is responsible for emergency alerting and response procedures. Barr personnel shall not attempt any response procedures, except those necessary for the safe evacuation of others.

10.0 Critique of Response and Follow-up

Upon attainment of nonemergency conditions, the Company Safety Manager and the Project Manager shall be notified of the site occurrences. Follow-up discussions and changes in project site safety shall be documented in the Barr Safety Diary.

11.0 PPE and Emergency Equipment

The general contractor on the site shall be responsible for responding to the emergency. Barr personnel shall maintain a distance of 100 feet

upwind of the emergency operations and shall wear protective equipment consistent with levels of protection as determined in this project safety plan.

Appendix B

APPENDIX B
COLD STRESS GUIDELINES

Major injuries to extreme cold temperatures are general hypothermia and frostbite. Cold stress can also occur when impermeable protective clothing is removed and all clothing underneath is perspiration soaked. Precautionary measures to prevent cold stress are contained in this section.

A. **FROSTBITE AND EMERGENCY CARE**

FROSTBITE is the literal freezing of body tissue. There are three stages:

1. Incipient (Frost Nip): Affects tips of ears, nose, cheeks, fingers, toes, chin. The skin is blanched white and painless.
2. Superficial: Affects skin and tissue just beneath the skin. Skin is firm and waxy, tissue beneath is soft, numb and then turns purple during thawing.
3. Deep: Affects entire tissue depth. Tissue beneath skin is solid, waxy, white with a purplish tinge.

EMERGENCY CARE FOR EACH STAGE OF FROSTBITE:

1. Emergency Care for Incipient Frostbite: Skin can be warmed by applying firm pressure with a hand (no rubbing), by blowing warm breath on spot or by submerging in warm water. Have another person test water temperature to be sure it is not too hot.

2. Emergency Care for Superficial Frostbite: Treatment includes providing dry coverage and steady warmth. Submerging in warm water is helpful. Check water temperature first.
3. Emergency Care for Deep Frostbite: This person needs emergency hospital care. Call for emergency medical assistance. Dry clothing over frostbite will help prevent further injury. Submerging in warm water will help thaw. If frostbitten tissue is a nose or ear, pour warm water over the affected area instead of attempting submersion. The frostbitten part should not be rubbed in any way. The part should not be thawed if the person must walk on it to get to a medical facility. Never initiate thawing if there is any danger of refreezing. Do not delay transport to a medical facility for rewarming.

B. HYPOTHERMIA AND EMERGENCY CARE

The body's first defense against cold is constriction of the blood vessels of the skin and/or shivering. Shivering produces heat through rapid contractions of muscles and raises the body's metabolic rate and internal core temperature.

Hypothermia manifests itself in five stages:

1. **Shivering** -- May be uncontrollable.
2. **Indifference** -- Sleepiness, apathy, and listlessness.
3. **Unconsciousness** -- Usually accompanied by a slow respiratory rate and a slow pulse rate.

4. Freezing of the extremities.

5. Death.

Predisposing factors

Prevention

- | | |
|--|---|
| 1. Poor physical condition. | Rest and eat before exertion. |
| 2. Failure to eat/drink enough or little body fat. | Nibble high energy food throughout day. Drink water at each rest break. |
| 3. Inadequate clothing. | Wear windproof outer clothing (tyvek) or windbreaker, wool underneath. |
| 4. Wetness (from perspiration or precipitation). | Wear polypropylene or wool underwear. Carry warm change of clothes. |

EMERGENCY RESPONSE FOR HYPOTHERMIA:

Emergency care entails preventing heat loss, rewarming the person and remaining alert for complications. Call for emergency medical assistance.

1. Handle person very gently.
2. Remove wet clothing. Replace with dry coverings.
3. Add heat gradually and gently by applying chemical heat packs to groin, chest, neck and head. Use warmed blankets or other bodies.
4. Do not rub or manipulate the extremities.

5. Do not give coffee or alcohol.
6. Warm fluids can only be used after uncontrollable shivering stops and person has a clear level of consciousness and can swallow.
7. Keep temperature constant throughout emergency care.
8. Transport to medical facility as soon as possible.

C. SUGGESTIONS TO PREVENT COLD STRESS

1. FEET: Wear two pair of socks. Inner layer should be made of polypropylene or wool material to wick moisture from skin. The second layer should be a thick wool, to insulate the air around the foot. Keep an extra set of socks on site. Keep feet dry. Wear pack boots (steel-toed) with wool felt or Thinsulate liners.

To keep toes warm, shake one foot at a time. Keep toes moving. Keep feet moving.

2. HANDS: Wear two layers of gloves. Inner glove layer should be wool. Outer glove layer -- insulating and water-proof material. Gloves should fit loosely to keep air insulated around fingers. Wear mittens, if possible. Keep hands dry.

To keep hands warm, increase circulation to fingers. This can be done by shaking hands and by swinging arms in large circles. These movements encourage blood flow to the extremities.

3. FACE: Use a wind protective cream on face and ears. Creams containing beeswax work best. Re-apply throughout day. Cover as

much of your face and ears as possible. Wear faceshield to cut wind exposure.

4. HEAD: Keep head covered. A hard hat liner will cover both head and ears and protect against body's heat loss through head.
5. BODY: Wear several layers of clothing. Polypropylene, wool or silk underwear are good inner layers. Tyvek is a good windbreaker. Insulated coveralls work well. Insulate neck with scarf or turtleneck. Keep an entire extra change of clothes. Remove wet clothing immediately.
6. SHELTER: Use warm shelters and take regular rest periods.

Appendix C

APPENDIX C
HEAT STRESS GUIDELINES

Major injuries to extremely hot environments are heat stroke, heat exhaustion, and heat cramps. Heat stress can occur when the temperature is moderately high, when humidity is high, when there is little breeze, or when protective clothing does not permit natural cooling of the body. Precautionary measures to prevent heat stress are contained in this section.

A. HEAT STROKE

Occurs when the body's natural heat regulatory mechanisms break down and fail to cool the body sufficiently. The body becomes overheated and the body temperature rises to between 105°F - 110°F. NO SWEATING OCCURS.

SYMPTOMS:

- Dry, hot skin, usually red.
- Constricted pupils.
- Very hot body temperature.
- Rapid and strong pulse.

TREATMENT:

- Call for emergency medical assistance.
- Emergency care is aimed at immediately cooling the body.
- Remove the person from direct sunlight.
- Undress the person, wet down their body with cold water, and fan them as briskly as possible.
- Wrap person in cold, water soaked sheets and call for ambulance or transport to hospital as quickly as possible. Elevate person's head and shoulders and make sure that person is comfortable.
- Move to air-conditioned area, if possible, and apply ice packs to head and body pulse points while awaiting emergency assistance.

B. HEAT EXHAUSTION

Occurs when the body has lost large quantities of salt and water through profuse sweating. When the water is not adequately replaced, blood circulation diminishes. Heat exhaustion is sometimes accompanied by heat cramps, due to loss of salt.

SYMPTOMS: ■ Moist, clammy skin, usually pale.

 ■ Dilated pupils.

 ■ Weakness/dizziness and/or nausea.

TREATMENT: ■ Move person to cool place.

 ■ Apply cold, wet compresses to the skin and fan person lightly.

 ■ Raise the feet 8 to 12 inches to increase blood circulation to brain.

 ■ Remove as much of a person's clothing as possible, and loosen what you cannot remove.

 ■ Administer sips of Gatorade, one-half glass every 15 minutes.

 ■ Seek medical attention.

C. HEAT CRAMPS

Muscular pains and spasms occur when the body loses too much salt during profuse sweating or when inadequate salt is taken into the body. Usually occurs in the arms, legs, or abdomen, and are often a sign of approaching heat exhaustion.

- SYMPTOMS: ■ Muscular pain in the arms, legs, or abdomen
- TREATMENT: ■ Administer sips of Gatorade, one-half glass every 15 minutes.
- Do not massage cramping muscles. Massage does not cure the heat cramps and may actually increase the pain.
- Note: Some experts recommend massage as long as it does not increase pain or discomfort.
- Help the person to remain calm and relaxed.

D. HEAT RASH (Prickly Heat)

Caused when sweat is not easily removed from the skin surface and aggravated by chafing clothes.

- SYMPTOMS: ■ Red rash and/or small red bumps on skin.
- TREATMENT: ■ Rest in cool place.
- Allow skin to dry.
- Change into dry clothes.

E. RECOMMENDATIONS TO PREVENT HEAT STRESS

1. To prevent dehydration, drink generous amounts of fluids, even if not thirsty. To replace body fluids lost during sweating, drink water, Gatorade, or flavored drinks. Avoid coffee or alcohol consumption, as these fluids will contribute to dehydration.
2. Health related problems can happen before the sensation of thirst occurs. A good rule to follow, is to drink a glass of water every time you go to the bathroom.

3. Use salt generously on foods, unless on a low-salt diet.
4. Take frequent rest breaks. Ensure that there is a shaded shelter area for rest breaks and coolers are filled with water or Gatorade. On very hot days, air-conditioned rest areas should be used.
5. In extremely hot weather, work in early morning and evening hours. The hottest time of the day is generally 2:00 - 4:00 p.m.
6. Peel off protective garb during rest breaks.
7. It takes about five days to acclimatize to working in a hot environment. The acclimatized person sweats less, and loses less salt in the sweat.

Reference for COLD/HEAT STRESS GUIDELINES:

Karren, K. J. and Hafen, B. Q. 1986
FIRST RESPONDER-A Skills Approach
Morton Publishing Company
Englewood, Colorado

Appendix D

APPENDIX D
RESPIRATOR PROGRAM

1.0 Purpose

The purpose of the respirator program is to:

- Provide respiratory protection for employees while working on sites covered by the Project Safety Plan.
- Provide emergency escape respirator protection for employees working on sites covered by the project Safety Plan.

2.0 Respirator Equipment

Respirator selection is made according to the American National Standards Institute (ANSI Z88.2-1980, Practices for Respiratory Protection). Barr provides respirators approved by NIOSH (National Institute of Occupational Safety Health) and MSHA (Mine Safety and Health Administration).

2.1 Types of Respirators

Barr provides the following types of respirators:

- Mine Safety Appliance (MSA) Ultratwin full facepiece respirator (Protection Factor = 100).
- MSA Comfo half mask respirator (Protection Factor = 10).

- MSA Self-Contained Breathing Apparatus (SCBA),
Model No. 401 - Air Work Mask (pressure demand, Protection
Factor = 10,000).
- MSA Supplied Air (SA); to be worn with the Air Work Mask
(pressure demand, Protection Factor = 1000)
- International Safety Instruments, Inc. (ISI) Emergency Life
Support Apparatus (ELSA) - 5 minute supply of air for escape
use only.
- 3M 8715, 8720, 9970 Disposable Respirator (Protection Factor
= 5); nuisance dust only.

2.2 Types of Filters and Cartridges

Barr provides the following types of filters and cartridges to be worn with full facepiece and half mask respirators. They are stored on a shelf in the safety equipment room. They are not to be used for entry into atmospheres immediately dangerous to life or health, nor for use in atmospheres containing less than 19.5 % oxygen.

- MSA GMC-H (Approval No. TC-23C-153). Combination cartridge for organic vapors, acid gases, and particulates (not formaldehyde), including asbestos-containing dusts and mists and radionuclides. Approved for use by NIOSH/MSHA in atmospheres containing not more than 1,000 ppm (parts per million) organic vapors, 10 ppm Cl, 50 ppm HCl, 50 ppm SO₂, 1 ppm ClO₂, 100 ppm H₂S (escape only).
- MSA HEPA (Approval No. TC-21C-135). High efficiency particulate air filter for removal of radionuclides and dust fumes and mists having

a time weighted average of less than 0.05 mg/m³, including asbestos dusts and mists.

2.3 Air Quality

When air is supplied through a respirator such as the SCBA or SA, the breathing air shall meet the Compressed Gas Association (CGA-CG7.1) Standards - Grade D or better.

2.4 Air Cylinders

Cylinders used to supply air are tested and maintained as prescribed in Shipping Container Specifications (49 CFR 178). The cylinders are at approximately 2400 pounds per square inch (psi) when full. Compressed air cylinders are visually inspected annually and hydrostatically tested once every five years. These test dates are noted with a label for visual inspection testing and a stamp for hydrostatic testing.

2.5 Corrective Lenses

Barr recommends that contact lenses be removed before a full facepiece respirator is placed on the face. Barr provides spectacle kits (smoke specs) for all employees who may need optical correction while wearing a full facepiece respirator. These insert into the facepiece mask and do not compromise the facepiece-to-face seal.

3.0 Respirator Selection

Respirators will be selected based on the types of hazards present on sites covered by this plan. Factors considered when determining which type of respirator to use are:

- Contaminant level: when the suspected exposure level may be greater than the action level determined in the Project Safety Plan.
- Toxicity of hazardous substance, pollutant, or contaminant.
- Length of anticipated exposure to hazardous substance, pollutant or contaminant.
- Potential for increase in exposure levels.
- Presence of other hazardous substances, pollutants or contaminants.
- When hazardous substances, pollutants or contaminants cannot be identified.
- Monitoring method used to determine hazardous substance, pollutant, or contaminants.

3.1 Respiratory Level of Protection

The Project Safety Plan will describe the level of respiratory protection that will be necessary for work on sites covered by this Plan. These levels are:

Level D: Disposable respirator and ELSA use is optional.

Level C: Full facepiece or halfmask respirator with a filter/cartridge is required. A full facepiece respirator with a canister may be substituted. ELSA is optional.

Level B: SCBA/SA is required.

Level A: In the event that Barr employees are required to work at Level A protection, additional special training and equipment will be required.

4.0 Project Site Surveillance

Personal air monitoring is done to determine the level of hazardous substance, pollutant or contaminant on the site. Monitoring is continued on a regular basis (the frequency is stated in the Project Safety Plan) to determine if an upgrade to Level C respiratory protection is necessary.

5.0 Training

All employees covered by this Plan are trained in the proper use of respirators and their limitations during the initial (40 hour and 24 hour) training program. Additionally, they are trained on an individual basis when they are fit tested in the Barr safety equipment room. This training is reviewed annually at the 8 hour annual refresher course. Training provides the user the opportunity to:

- Handle the respirator.
- Have the respirator fit properly (qualitative fit test). Conditions such as beard growth, sideburns and temple pieces on glasses may prevent a good face seal and cannot be worn by Barr employees using a respirator.
- Test the facepiece-to-face seal with a negative and positive pressure fit test.
- Wear the respirator in normal air for a familiarity period.

- Wear the respirator in a test atmosphere which contains nontoxic irritant smoke.

This training also covers proper donning/doffing, maintenance and repair, and proper storage procedures.

6.0 Proper Use of Respirators

There is a specific sequence of procedures which must be followed to ensure a good respirator fit. This donning procedure, as well as the recommended doffing procedure, is listed below.

6.1 Respirator donning procedure

- Release straps to full open position
- Holding respirator in one hand, place respirator to face so that the chin is inserted into chin cup of respirator.
- Push respirator up to face and, with other hand, pull head straps simultaneously.
- Pull lower straps reasonably tight. Try to pull both straps simultaneously.
- Pull top straps until snug.
- Straps should hold facepiece securely to face but should not be overly tight.
- Adjust facepiece for comfort and fit.

- Perform negative pressure test by placing hands over the intake valves and sucking in to determine whether air is leaking in.
- Perform positive pressure test by removing exhalation valve cap and placing a hand over the exhalation valve and blow to determine if air is leaking out.
- Readjust facepiece until a good fit is made.

6.2 Respirator Removal Procedure

- The respirator may be contaminated, so care must be exercised in removing it.
- The respirator is one of the last things to be removed when leaving the contaminated area.
- Release straps and pull respirator over head.
- Pull straps over respirator faceshield to protect the lens.
- Lay respirator so that it will not become contaminated inside or will not contaminate other things.
- Follow the cleaning/disinfecting procedure in Section XX.
- If the respirator is not cleaned at this time, it is placed in the designated "dirty" plastic bag, kept in the storage box, to be cleaned at a later time. After it is cleaned, it is placed in the designated "clean" plastic bag.

- Alcohol wipes are included in the respirator boxes to clean the inside of the respirator, the sealing flange, and the outside of the respirator (in that order) between uses throughout the day.

7.0 Respirator Fit Tests

A qualitative respirator fit test, using irritant smoke to detect leaks in the facepiece-to-face seal is given to all employees to assure a good fit. The fit test procedure is described below:

- The respirator is donned.
- Negative and positive pressure tests are performed.
- A 3M FT-10 hood (Qualitative Fit Test Apparatus W-5220) is placed over the employee's head.
- Irritant smoke is directed toward the faceseal surfaces, constantly challenging the facepiece to face seal. Irritant smoke is generated from a Ventilation Smoke Tube (MSA Part No. 5645).
- Exercises performed by the employee are: head side to side, head up and down, deep breathing, running in place, normal breathing, recitation of "Rainbow Passage". Smoke is directed toward the stressed faceseal surface.
- If there are no signs of leakage (ie. throat irritation), the respirator is considered to fit that employee.
- The employee is assigned a respirator of the same style and size along with a storage box with the appropriate accessories. The

employee signs the Respirator Fit-Test book, located in the Equipment Maintenance Room, and the person conducting the respirator fit-test also signs the book, indicating that the employee successfully passed the fit-test.

8.0 Respirator Maintenance/Repair

Barr employees covered by this Plan are responsible for inspecting their respirators prior to each use. Employees should perform emergency respirator repair as needed. The Equipment Maintenance Technician is available for non-emergency repairs.

9.0 Respirator Cleaning/Disinfection Procedure

Employees are responsible for the cleaning and disinfection of their respirator after each use. The cleaning/disinfection procedure is described below:

- Break down the respirator into its component parts.
- Discard the expended filters or cartridges.
- Discard headstraps and valves if they are too contaminated to be cleaned or are no longer functional.
- Wash remaining parts in warm water with a mild detergent (MSA Cleaner-Sanitizer II or similar). Scrub parts with a soft brush.
- Rinse.
- Air dry respirator in a clean area.

- Place respirator in "clean" plastic bag, seal, and place in storage box.

10.0 Storage

Each employee is assigned a numbered box for storage of their respirator. This box is kept on a shelf in the safety equipment room. The box contains: A33 cleaning powder for washing the respirator, alcohol wipes for midday use, a spare exhaust valve, 2 spare inhalation valves, 2 cartridge gaskets, a lens protector, a designated "dirty" plastic bag, a designated "clean" plastic bag, 2 spare HEPA cartridges, and 2 spare GMC-H cartridges. Employees covered by this Plan have their names listed alphabetically with their corresponding respirator numbers on the wall of the safety equipment room. Respirators are stored in a plastic bag in their storage box, with the facepiece resting in a normal position.

11.0 Inspection

All full facepiece respirators, SCBAs and SA apparatus are inspected once a month by the Equipment Maintenance Technician, and before each use by the employee that will be using the respirator. Respirators are also inspected during cleaning. Compressed air cylinders are checked to see they are fully charged according to the manufacturer's instructions. Respirator inspection includes a check on the condition of:

- Facepiece
- Headbands
- Valves
- Connecting tube
- Rubber or elastomer parts

Replacement or repairs on the full facepiece respirators are done only with parts designated for the respirator by the manufacturer. Repairs on SCBA/SA respirators are performed only by the manufacturer. Records are maintained in the yellow notebook located in the safety equipment room. Records include inspection dates and comments on respirator maintenance.

12.0 Program Evaluation

The effectiveness of the respirator program is evaluated annually at the annual refresher training session through input from employees covered by this Plan, and is reviewed regularly by the Company Safety Manager.

13.0 Medical Surveillance

Each employee covered by this Plan undergoes a physical exam and pulmonary function test prior to being issued a respirator. This physical exam and pulmonary function test evaluates their ability to wear a respirator under conditions which may be expected at the Project Site. Medical surveillance for Barr employees who may be required to wear a respirator is conducted annually.

Appendix E

APPENDIX E

TOXICITY PROFILES FOR SELECTED SITE-RELATED SUBSTANCES

| CHEMICAL | IDLH LEVEL (PPM) | TLV ¹ (PPM) | STEL (PPM) | I.P. (eV) | ACUTE EFFECTS ³ | CHRONIC EFFECTS ⁴ | FLAMMABILITY RANGE | | CARCINOGENICITY CLASS ⁵ | OTHER |
|----------|------------------|----------------------------|------------|-----------|--|--|--------------------|-------|--|--|
| | | | | | | | LEL % | UEL % | | |
| Arsenic | Ca | 0.2 mg/m ³ | NA | NA | Inhalation can cause severe respiratory irritation; oral exposure may cause cramps, G.I. damage, swelling and death. | Skin changes may be produced (including pigmentation changes) upon oral or inhalation exposure; vascular, nervous system and liver injury may result | NA | NA | OSHA: Yes US EPA: Class A ACGIH: No ⁷ | Properties vary depending on specific compound; essential element |
| Benzene | Ca | 10 1 (PEL) ² | Ca | 9.24 | Central nervous system (CNS) depressant (headache, fatigue, dizziness, nausea); eye, skin, respiratory irritant. | Toxic to bone marrow cells, leading to anemia (fatigue, headache, nausea, anorexia); continued exposure results in leukemia. | 1.3 | 7.1 | OSHA: Yes US EPA: Class A ACGIH: A2 | OT: 4.68 ppm VP: 75 mm BP: 176°F Sol: Slightly sol. in water; very sol. in organic solvents and oils FP: 12°F |

APPENDIX E (cont.)
Toxicity Profiles for Selected Site-Related Substances
 (Page 2)

| CHEMICAL | IDLH LEVEL (PPM) | TLV ¹ (PPM) | STEL (PPM) | L.P. (eV) | ACUTE EFFECTS ³ | CHRONIC EFFECTS ⁴ | FLAMMABILITY RANGE | | CARCINOGENICITY CLASS ⁵ | OTHER |
|---|----------------------|---|------------|-----------|---|---|--------------------|-------|---|--|
| | | | | | | | LEL % | UEL % | | |
| Coal Tar Pitch Volatiles (benzene solubles) | Ca | 0.2 mg/m ³ and presence of benzo(a) pyrene, acridine, chrysene, pyrene, phenanthrene | NA | NA | Acute toxicity appears low in lab animals, although occupational exposure has caused skin reactions and eye irritation. Acute and chronic effects of cPAHs and nPAHs are similar. | Dermatitis may result from skin exposure; animal studies show oral administration may lead to blood disorders and liver, kidney, and ocular effects. cPAHs may produce immunosuppressive effects in humans. | NA | NA | OSHA: Some yes US EPA: A2 (benzo(a) pyrene) ACGIH: A1 | Properties vary; Low VP |
| Cyanide (skin) ⁶ | 50 mg/m ³ | 5 mg/m ³ | NA | NA | Exposure to hydrogen cyanide can result in constriction of the throat, nausea, vomiting, staggering, headache; high levels may lead to unconsciousness, convulsions, and death. | Chronic cyanide poisoning in a serious or incapacitating form is rare; fatigue, nausea, and headaches may occur. | NA | NA | OSHA: No US EPA: None ACGIH: No | OT: 1 mg/m ³ |
| Ethyl benzene | 2,000 | 100 | 125 | 8.76 | Respiratory, eye, skin irritants; CNS depressants (nausea, dizziness, headache, fatigue); vomiting; abdominal pain. | Dermatitis; bronchitis. | 1 | 6.7 | OSHA: No US EPA: None ACGIH: No | OT: 0.092-0.6 ppm VP: 7.1 mm BP: 277°F Sol: 0.01% FP: 55°F |

APPENDIX E (cont.)
Toxicity Profiles for Selected Site-Related Substances
 (Page 3)

| CHEMICAL | IDLH LEVEL (PPM) | TLV ¹ (PPM) | STEL (PPM) | L.P. (eV) | ACUTE EFFECTS ³ | CHRONIC EFFECTS ⁴ | FLAMMABILITY RANGE | | CARCINOGENICITY CLASS ⁵ | OTHER |
|--|-------------------------|--------------------------------|------------|------------------------|---|--|--------------------|-------|---|--|
| | | | | | | | LEL % | UEL % | | |
| Mercury (all forms except alkyl vapor) | 10-28 mg/m ³ | 0.03 mg/m ³ (alkyl) | NA | 0.05 mg/m ³ | Inhalation of mercury vapor can cause bronchitis and nervous system effects; the vapor and organic mercury can be absorbed through the skin. Oral exposure can result in abdominal cramps, shock and kidney damage. | Repeated exposure may result in nervous system effects and personality changes. Exposure to organic mercury can cause vision disorders, numbness, weakness, nerve degeneration and death. | NA | NA | OSHA: No EPA: None ACGIH: No | Vapor: VP = 0.0012 mm BP = 674°F |
| Naphthalene | 500 | 10 | 15 | 8.12 | Oral exposure may produce abdominal pain, nausea, vomiting. Skin/eye contact can lead to systemic effects, conjunctivitis (pink eye), dermatitis. | Vapor dust and oral exposure may lead to cataracts and retinal degeneration; dermatitis may result from skin contact. | .9 | 5.9 | OSHA: No US EPA: None ACGIH: No | OT: 0.08 ppm VP: 0.05 mm FP: 174°F BP: 424°F Sol: 0.003% |
| PAHs | NA | NA | | | Acute toxicity appears low in lab animals, although occupational exposure has caused skin reactions and eye irritation. Acute and chronic effects of cPAHs and nPAHs are similar. | Dermatitis may result from skin exposure; animal studies show oral administration may lead to blood disorders and liver, kidney, and ocular effects. cPAHs may produce immuno-suppressive effects in humans. | NA | NA | OSHA: Some yes US EPA: A2 (benzo(a) pyrene) ACGIH: A1 | Properties vary; Low VP |

APPENDIX E (cont.)
Toxicity Profiles for Selected Site-Related Substances
(Page 4)

| CHEMICAL | IDLH LEVEL (PPM) | TLV ¹ (PPM) | STEL (PPM) | I.P. (eV) | ACUTE EFFECTS ³ | CHRONIC EFFECTS ⁴ | FLAMMABILITY RANGE | | CARCINOGENICITY CLASS ⁵ | OTHER |
|----------------------------|------------------|------------------------|------------|-----------|---|--|--------------------|-------|--|--|
| | | | | | | | LEL % | UEL % | | |
| PCBs (skin) ⁶ | Ca | 0.5 mg/m ³ | NA | NA | Oral ingestion of PCBs has produced liver damage, general fatigue, and weight loss in rats; nausea, swelling of the hands and face may occur upon acute exposure. | Chronic human exposure to PCBs has led to headaches, fever, vomiting, diarrhea and chloracne (a skin disease). | NA | NA | OSHA: No US EPA: Class B2 ACGIH: No ⁷ | VP: 0.001 to 1E-06 BP: 617-691°F FP: 349°F |
| Phenol (skin) ⁶ | 250 | 5 | NA | 8.5 | Corrosive to tissue; may cause severe eye damage and blindness; systemic effects from any route of exposure may include weakness, sweating, headache, ringing in ears, excitement or shock. | Skin discoloration; possible liver and kidney damage. | 1.7 | 8.6 | OSHA: No US EPA: None ACGIH: No | OT: 0.05 ppm VP: 0.36 mm BP: 359°F FP: 174°F Sol: 8.4% |
| Toluene | 2,000 | 100 | 150 | 8.82 | Respiratory, eye, skin irritants; CNS depressants (nausea, dizziness, headache, fatigue); vomiting; abdominal pain. | Dermatitis; bronchitis. | 1.3 | 7.1 | OSHA: No US EPA: None ACGIH: No | OT: 0.17 ppm VP: 22 mm BP: 231°F Sol: 0.05% FP: 40°F |
| Xylene | 1,000 | 100 | 150 | 8.56 | Respiratory, eye, skin irritants; CNS depressants (nausea, dizziness, headache, fatigue); vomiting; abdominal pain. | Dermatitis; bronchitis. | 1 | 7 | OSHA: No US EPA: None ACGIH: No | OT: 0.05-20 ppm VP: 9 mm Sol: Insol. FP: 63°F (ortho) |

APPENDIX E (cont.)
Toxicity Profiles for Selected Site-Related Substances
 (Page 5)

¹TLV (Threshold Limit Value): The ACGIH time-weighted average airborne concentration, to be used as guidelines for a normal 8-hour workday and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

²PEL (Permissible Exposure Limit): OSHA-regulated time-weighted average airborne concentration for a normal 8-hour workday and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

³Symptoms which may occur upon short-term high level exposure.

⁴Symptoms which may occur upon long-term low level exposure.

⁵Carcinogenicity Classifications

| Group | Category |
|--|--|
| U.S. EPA Classification of Overall Weight-of-Evidence for Human Carcinogenicity | |
| A | Human carcinogen - sufficient evidence from epidemiological studies. |
| B1 | Probable human carcinogen - limited human evidence. |
| B2 | Probable human carcinogen - inadequate human data but sufficient evidence in animals. |
| C | Possible human carcinogen - limited animal evidence and no human data. |
| D | Not classifiable as to human carcinogenicity - inadequate animal evidence. |
| ACGIH Carcinogen Categories | |
| A1 | Confirmed human carcinogens - recognized to have carcinogenic potential. |
| A2 | Suspected human carcinogens - suspected of inducing cancer, based on limited epidemiological evidence or animal studies. |

⁶Skin: Indicates skin absorption as an additional exposure route.

⁷Substance identified by other sources as a suspected or confirmed human carcinogen.

Ca: Suspected carcinogen

OT: Odor threshold

VP: Vapor pressure

BP: Boiling point

Sol: Solubility

FP: Flash point

LEL: Lower explosive limit in air, % by volume

UEL: Upper explosive limit in air, % by volume

I.P.: Ionization potential

STEL: Short-term exposure limits

APPENDIX E (cont.)
Toxicity Profiles for Selected Site-Related Substances
(Page 6)

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Appendix F

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to \$1,000 for each serious violation and for optional penalties of up to \$1,000 for each nonserious violation. Penalties of up to \$1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$10,000 for each such violation.

There are also provisions for criminal penalties. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to \$250,000 (or \$500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

| | |
|-------------------|----------------|
| Atlanta, GA | (404) 347-3573 |
| Boston, MA | (617) 565-7164 |
| Chicago, IL | (312) 353-2220 |
| Dallas, TX | (214) 767-4731 |
| Denver, CO | (303) 844-3061 |
| Kansas City, MO | (816) 426-5861 |
| New York City, NY | (212) 337-2378 |
| Philadelphia, PA | (215) 596-1201 |
| San Francisco, CA | (415) 744-6670 |
| Seattle, WA | (206) 442-5930 |

Elizabeth Dole

Elizabeth Dole, Secretary of Labor

U.S. Department of Labor

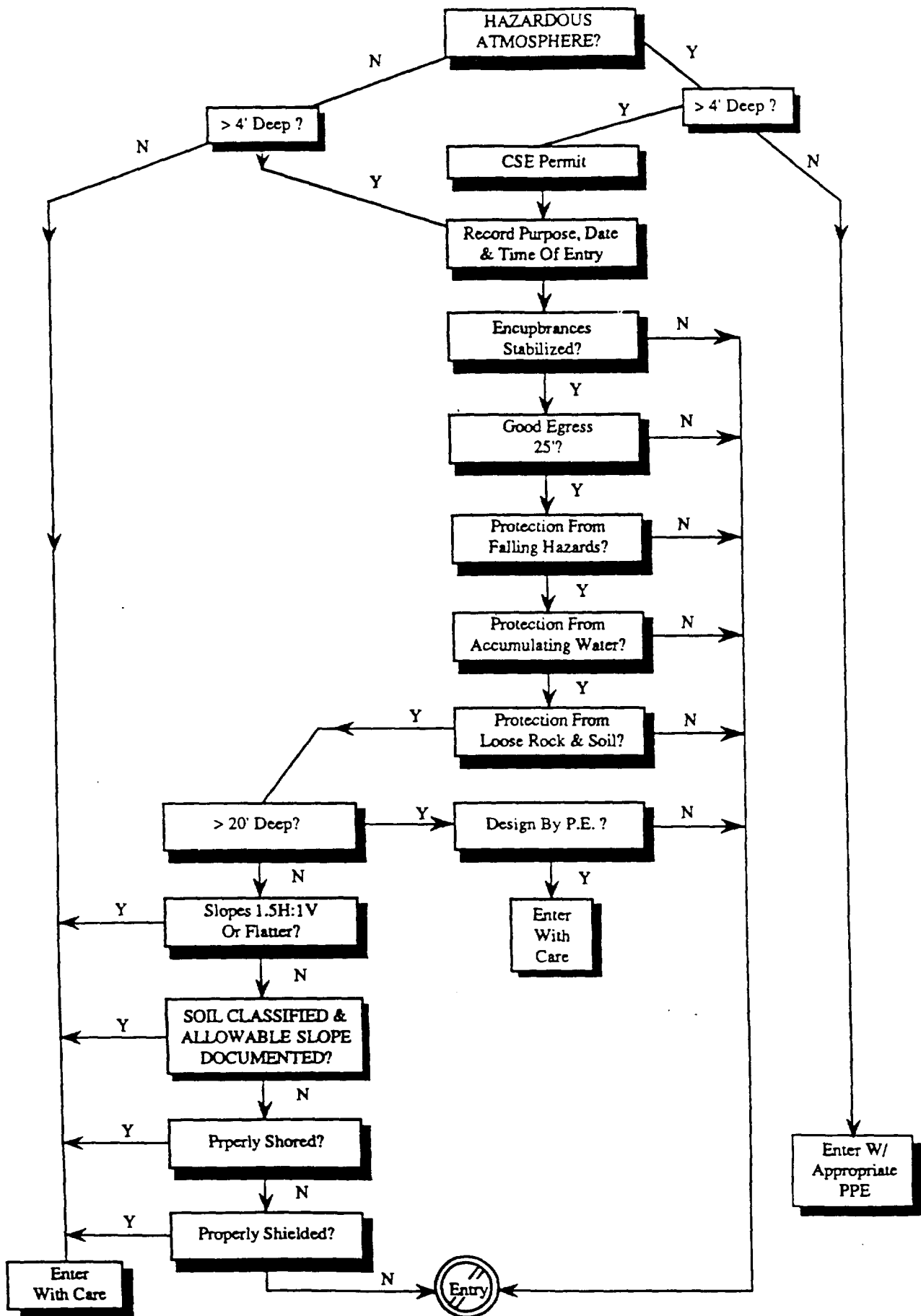
Occupational Safety and Health Administration

Washington, DC
1990 (Reprinted)
OSHA 2203



Appendix G

EXCAVATION ENTRY CHECKLIST



APPENDIX G

EXCAVATION ENTRY DEFINITIONS

Hazardous Atmosphere: Monitoring for toxic substances, oxygen content, and combustible gases should be conducted if a hazardous atmosphere is suspected.

CSE Permit: A confined space entry permit is required for entry.

Encumbrances Stabilized: Any surface or subsurface obstruction located so as to create a hazard to employees should be removed, protected, or stabilized as necessary to make them safe during excavation.

Good Egress Within 25 Feet: In trenches, an easily used, structurally sound means of exit (stairway, ladder, ramp or other safe means) should be within 25 feet of the work area.

Protection From Falling Hazards: Examples of falling loads include:

- loads handled by lifting or digging equipment,
- material falling from vehicles being loaded and unloaded, and
- mobile equipment.

Protective measures from falling loads may include:

- prohibiting employees from being under loads handled by lifting and digging equipment,
- standing away from vehicles being loaded and unloaded, and
- warning systems such as barricades, hand or mechanical signals, or stop logs, and
- grading away from the excavation.

Protection From Accumulating Water: Precautions which may be taken to protect employees from the hazards posed by water accumulation may include:

- special support or shield systems (cave-in prevention),

- water removal methods, and
- use of a safety harness and lifeline.

Protection From Loose Rock and Soil: Protection from loose rock, soil or other material or equipment which may fall or roll into the excavation from the excavation face or edge may consist of:

- scaling to remove loose material,
- barricades on the excavation face,
- equipment kept at least 2 feet from excavation edge, and
- retaining devices.

Design by P.E.: Sloping or benching for excavations greater than 20 feet deep shall be designed by a professional engineer registered in that state.

Slopes 1.5H:1V or Flatter: The excavation should be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees from horizontal).

Soil Classified and Allowable Slope Documented: Soils may be classified using the visual and manual soil classification methods described in the section following the checklist description. Results should be documented.

Properly Shored: Shoring should be in conformance with the tables in 29 CFR Part 1926 (see the Barr Health and Safety Training Manual), or verification should be made that it is in accordance with a design performed by a registered professional engineer whose design is available for on-site review.

Properly Shielded: Shielding (if used) should be designed for the depth of the excavation or greater in conformance with 29 CFR Part 1926, and the design should be available for on-site review.

Soil Classification System

Soil classification provides a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. These categories are defined in 29 CFR Part 1926, p. 45963.

The classifications of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Acceptable visual and manual tests are described below.

Visual Tests

Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

- Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.
- Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
- Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension

cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

- Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previous disturbed soil.
- Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify the layers slope toward the excavation. Estimate the degree of slope of the layers.
- Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

Manual Tests

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

- Plasticity - Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.

- Dry Strength - If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

Thumb penetration - The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual-Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

- Drying Test - The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately

one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

- (A) If the sample develops cracks as it dries, significant fissures are indicated.
- (B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as a unfissured cohesive material and the unconfined compressive strength should be unconfined.
- (C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.